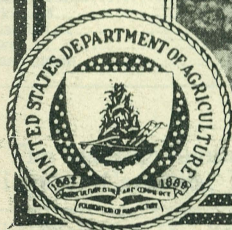
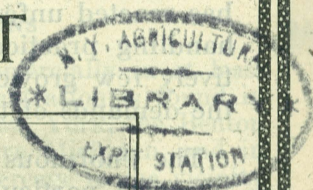


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# U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1558

## PREPARATION OF EASTERN GRAPES *for* MARKET





**E**ASTERN GRAPES which were formerly sold for table stock have been largely diverted from that market. The greater ease in meeting the comparatively low packing requirements for juice stock has reacted unfavorably upon general packing and handling practices, with the result that comparatively few growers have been attempting to meet the demands of the fancy table-grape trade.

The enormous expansion of the grape industry, however, particularly in California, has resulted in such keen competition in the marketing of juice grapes that the growers of eastern grapes are turning with renewed interest to the development of their table-stock trade.

This bulletin describes the harvesting, packing, and handling of eastern grapes for market. These methods have been employed with success by commercial growers in the various important producing sections.

Washington, D. C.

Issued March, 1928



# PREPARATION OF EASTERN GRAPES FOR MARKET

By B. E. SHAFFER, formerly Investigator in Marketing, Bureau of Agricultural Economics

## CONTENTS

	Page		Page
Leading producing sections .....	1	Loading .....	17
Commercial varieties .....	1	Grapes for juice factories .....	18
Harvesting and packing .....	3	Correct methods simple but impor-	
Packages .....	12	tant .....	18
Standardization and inspection .....	15		

## LEADING PRODUCING SECTIONS

EASTERN-TYPE grapes are produced commercially in at least seven States, but by far the greatest concentration is found in the Chautauqua and Finger Lakes areas of New York, the Benton Harbor and Paw Paw districts of southwestern Michigan, and in Erie County, Pa. Arkansas has a large new acreage in the vicinity of Springdale in the northwestern part of the State and ranks fourth in order of importance as a shipping State although still far below Pennsylvania. Figure 1 shows the location of the chief grape-shipping districts, and Table 1 gives an approximate idea of their relative importance, although each year an increasingly large volume is shipped from the eastern districts by motor truck.

For purposes of comparison the carload-shipment figures from California are also given, although grape production in that State is confined almost exclusively to the Vinifera or European varieties. It is probable that a greater proportion of the California commercial crop is moved in carloads than is the case in the eastern districts where there is an extensive truck movement.<sup>1</sup>

TABLE 1.—Carload shipments of grapes, by States of origin, 1926

State	Shipments	State	Shipments
	<i>Cars</i>		<i>Cars</i>
California .....	63,549	Ohio .....	101
New York .....	7,002	Delaware .....	89
Michigan .....	3,012	Kansas .....	69
Pennsylvania .....	1,355	Arizona .....	63
Arkansas .....	1,200	All other .....	104
Missouri .....	759		
Iowa .....	161	Total .....	77,585
Washington .....	121		

## COMMERCIAL VARIETIES

The leading commercial varieties of the eastern type are Concord, Niagara, Catawba, Delaware, Moore, Worden, and Champion. Of

<sup>1</sup> ALEMAN, DUDLEY. MARKETING EASTERN GRAPES. U. S. Dept. Agr., Dept. Bul. 861, 61 pp., illus., 1920.



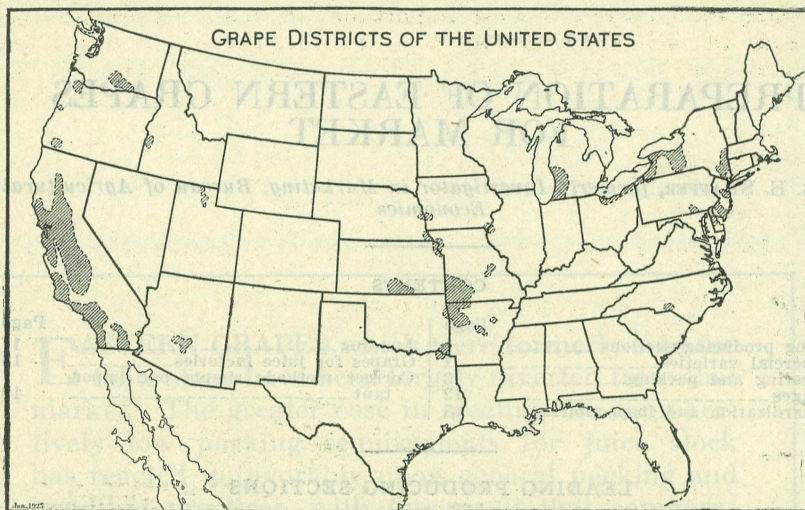


FIG. 1.—The grapes grown in California and Arizona are almost entirely of the *Vinifera* or European type. Native American grapes are grown in the other important districts shown. A large percentage of the crops of Michigan, New York, Pennsylvania, New Jersey, and Delaware are moved by auto truck



FIG. 2.—Picking grapes. Note type of picking bench used and method of cutting bunches of grapes



these the Concord is most important. A few wine grapes such as Ives and Elvira are grown to a very limited extent in the central lake district of New York. Other varieties of eastern grapes find their way into trade channels, but their production is not commercially important.

### HARVESTING AND PACKING

#### TIME OF PICKING

The proper stage of maturity for picking grapes may be judged with sufficient accuracy for commercial purpose by the color and taste. When the grapes have attained full color for their variety and have developed enough sugar to be palatable they are ready to harvest.

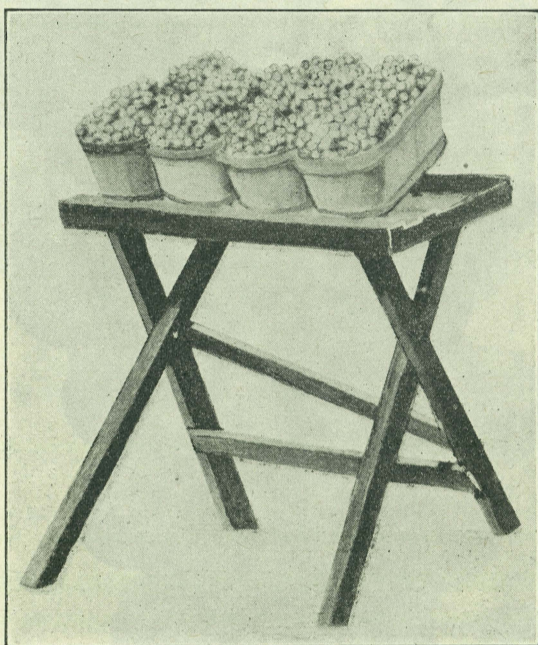


FIG. 3.—A common type of picking bench. Note long top, allowing room for four 4-quart baskets

No physical test capable of giving more reliable results has been developed. The use of the hydrometer in connection with what is popularly called the "sugar test," but which actually shows the percentage of solids in the juice, is common in California in connection with the enforcement of maturity standards for European varieties, but, depending upon climatic conditions, eastern-type grapes of the same variety and approximately the same degree of maturity may show a variation of several degrees in hydrometer readings.

#### PICKING

The operation of picking must be performed with great care, especially where a fancy table-grape pack is being put up. The bunches are easily crushed and bruised by rough handling, and



damp berries are soon followed by mold and decay, especially in warm weather. Shears or clippers are used to cut the clusters from the vines. Ordinarily the grapes are placed directly in the Climax baskets which are the usual shipping containers. The fancy packs are placed in the 2-quart and 4-quart baskets. For the lower grades the 12-quart size is used. (Fig. 2.)

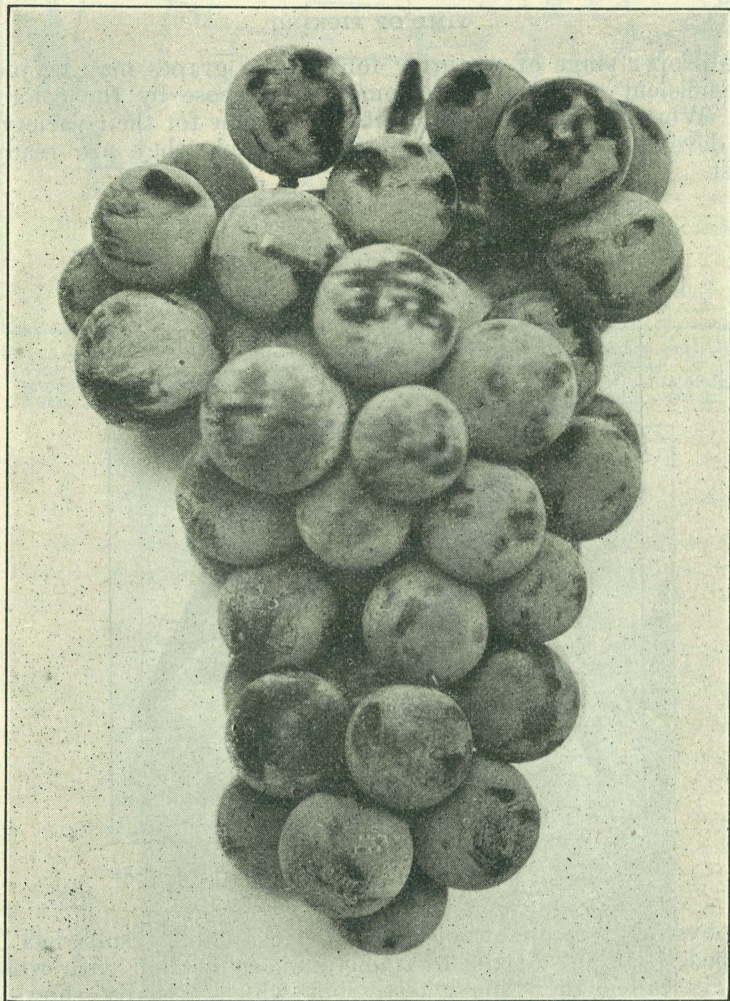


FIG. 4.—Quality of stock desired in the highest grade

Field benches are used for picking and packing. These benches are usually made by the growers, although a few commercially manufactured benches are in use in the New York and Pennsylvania districts.

A well-designed bench should be rigidly constructed of light material with the legs spread far enough apart to insure steadiness on the soft and more or less uneven ground in the vineyard. Thirty



inches is about the right height. The top should be about 16 inches wide and long enough to hold at least three baskets.

#### PACKING

Eastern grapes are usually packed in the vineyard. The best type of bench for the purpose is shown in Figure 3. It accommodates four baskets, and the sloping position in which they are held facili-

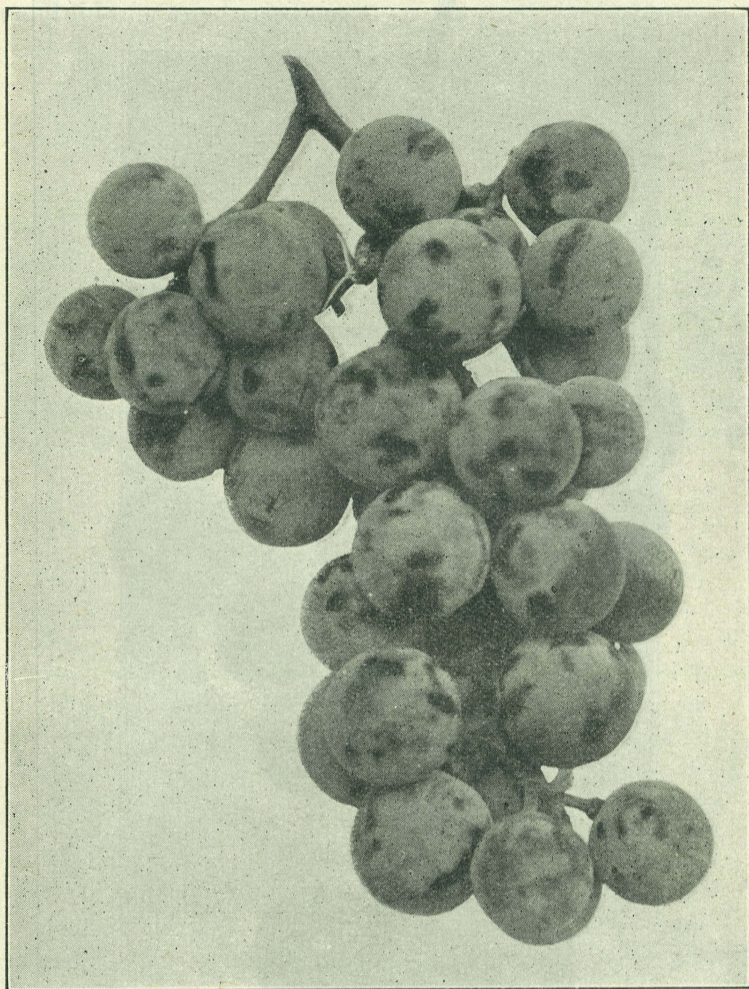


FIG. 5.—Quality of stock to be expected in a good average grade

tates packing. This arrangement permits packing three grades, with an extra basket for the culls. Typical U. S. Fancy, U. S. No. 1, and No. 2 bunches are shown in Figures 4, 5, and 6. Such grading is practicable only where the vineyard run is of good quality and the grapes are plentiful. In seasons of poor yields the picker seldom uses a stand or carries more than one basket. Proper grading under such circumstances is practically out of the question.



To start the pack properly the lower end of the basket should be filled first, as shown in Figure 7. The package is then filled carefully and snugly to a height of about 1 inch above the top of the basket, and the top of the grapes should be level, as shown in Figure 8. All



FIG. 6.—Quality of stock usually found in the lowest grade of eastern grapes. Such stock should not be packed for table use

stems should be concealed, and openings between the large bunches should be filled with smaller bunches. This method results in a full pack without danger of crushing the berries. The lids should not be put on until the stems wilt, for the wilting permits the bunches



to settle. The best vineyard packers remove the baskets from the vineyards on flat-topped wagons that hold but a single layer of baskets. After sufficient time has elapsed to permit the wilting of the stems the packs are inspected, slack packages are filled, and the lids are adjusted.

Some growers erect a temporary structure protected by a board or canvas roof and equipped with flat-topped tables, where the inspection and lidding are carried on.

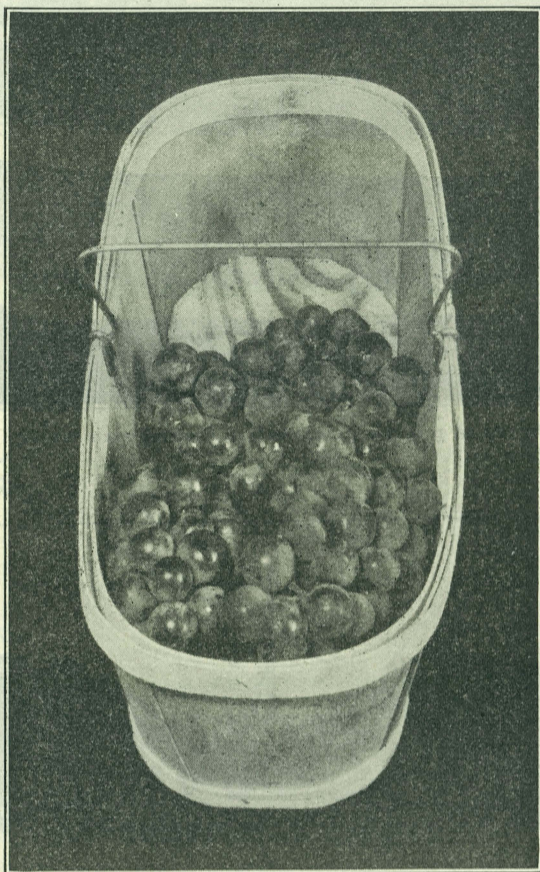


FIG. 7.—To pack a basket properly first fill the lower end of the tilted basket, finishing the top evenly, with all stems concealed as the packing operation is completed

Every effort should be made to avoid the necessity of repacking, as each time the bunches are handled there is danger of bruising and cracking the berries and of disturbing the characteristic attractive bloom. Crushing is certain to result if the bunches project too far above the top, as in Figure 9, and in hot weather such crushing frequently results in the development of mold within a few hours. During such periods it is highly important to place the fruit under refrigeration as soon as possible after packing. Grapes should be



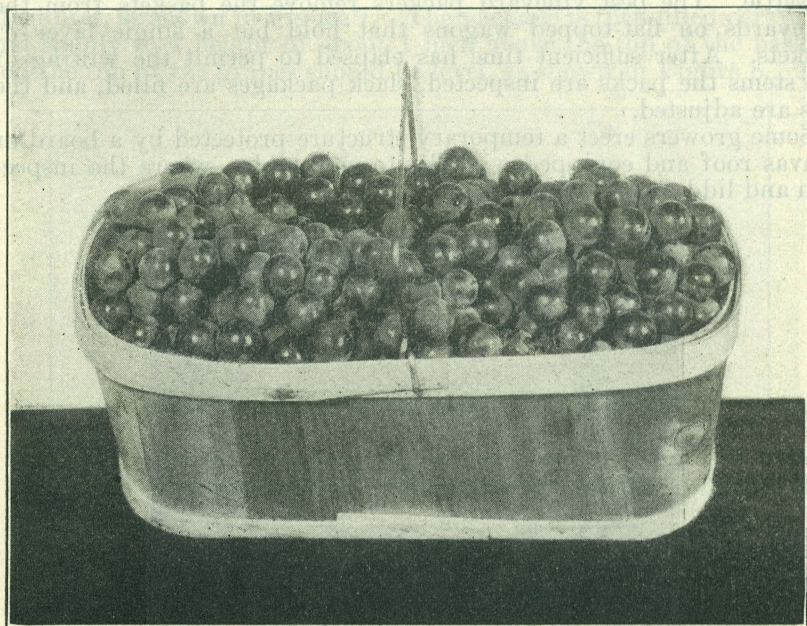


Fig. 8.—A properly packed basket, showing even surface

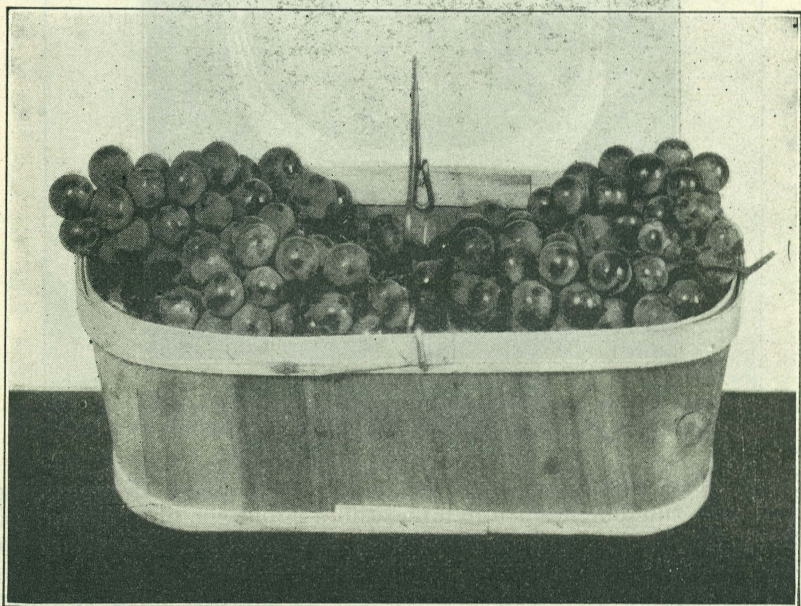


Fig. 9.—Improperly packed basket. When covers are placed on a basket packed in this way many berries are bruised and considerable decay often results



picked with great care and placed with the stems up in field boxes of the type shown in Figures 10, 11, and 12. If the grapes are handled in this way, the marketing season may be extended from three to six weeks without injury to the fruit. Late in the fall many of the most successful growers in New York, Pennsylvania, and Washington place their grapes in storage and pack them later in a packing house.

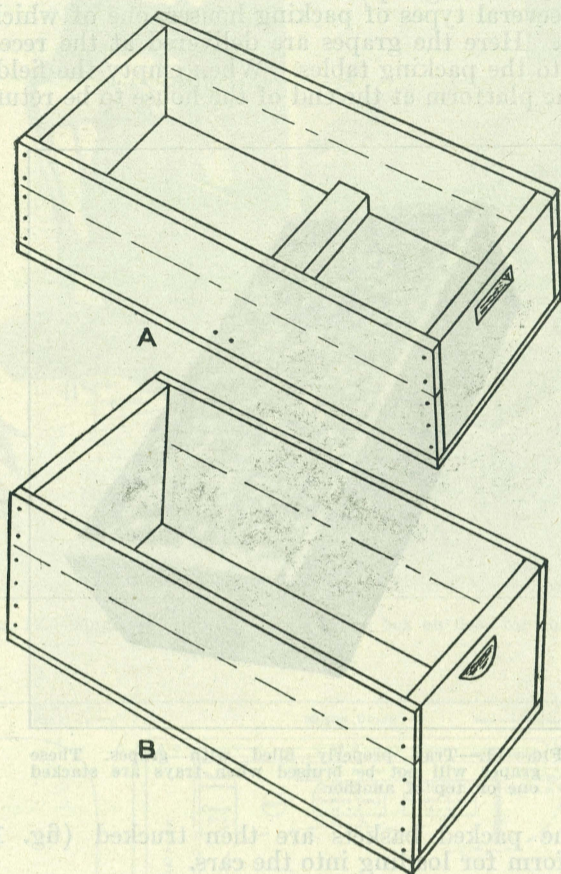


FIG. 10.—A, type of field picking tray in most common use. Outside dimensions, 24 inches long, 12 inches wide, and 6 inches deep. B, type of field picking tray used to a limited extent. Same dimensions as A, except that it is 2 inches deeper.

Grapes are stored at temperatures ranging from 32° to 50° F. Careful attention should be given to the humidity of the storage chamber to preserve the fresh, plump appearance of the berries. Some growers sprinkle the grapes, but this practice is not recommended unless it is carried on under the supervision of an experienced foreman.

The finest packs of table grapes are put up in packing houses. The packers operate under almost ideal conditions as far as personal



comfort is concerned. They are provided with clippers for the purpose of removing all crushed, cracked, and blemished berries as well as long, unsightly stems. The stems of the bunches of grapes to be packed in these houses are always permitted to wilt before the grapes are delivered to the packers. This permits bending the bunches to conform to the available space without cracking or bruising the berries. Much care is exercised in securing an even and attractive top and a tight pack.

There are several types of packing houses, one of which is shown in Figure 13. Here the grapes are delivered at the receiving door and trucked to the packing tables. When empty the field boxes are stacked on the platform at the end of the house to be returned to the

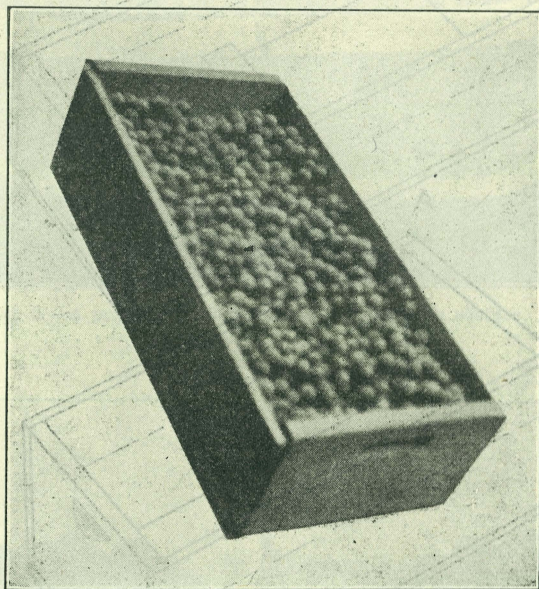


FIG. 11.—Tray properly filled with grapes. These grapes will not be bruised when trays are stacked one on top of another.

growers. The packed baskets are then trucked (fig. 14) to the loading platform for loading into the cars.

Empty baskets are stored in the second story of the building and are delivered to the packers through chutes.

Several types of packing benches are used, but Figures 15 and 16 show the most practical type, although some packers like the bench illustrated in Figure 12. The only difference in the tables shown in Figures 15 and 16 is the size of the unit.

Some packers place an attractive colored pad under the cover and place a label on the cover. A convenient labeling machine is shown in Figure 17. The paste is placed on the basket cover by drawing it over the roller, after which the label is placed. An experienced operator can paste 4,000 to 6,000 labels a day with this device.



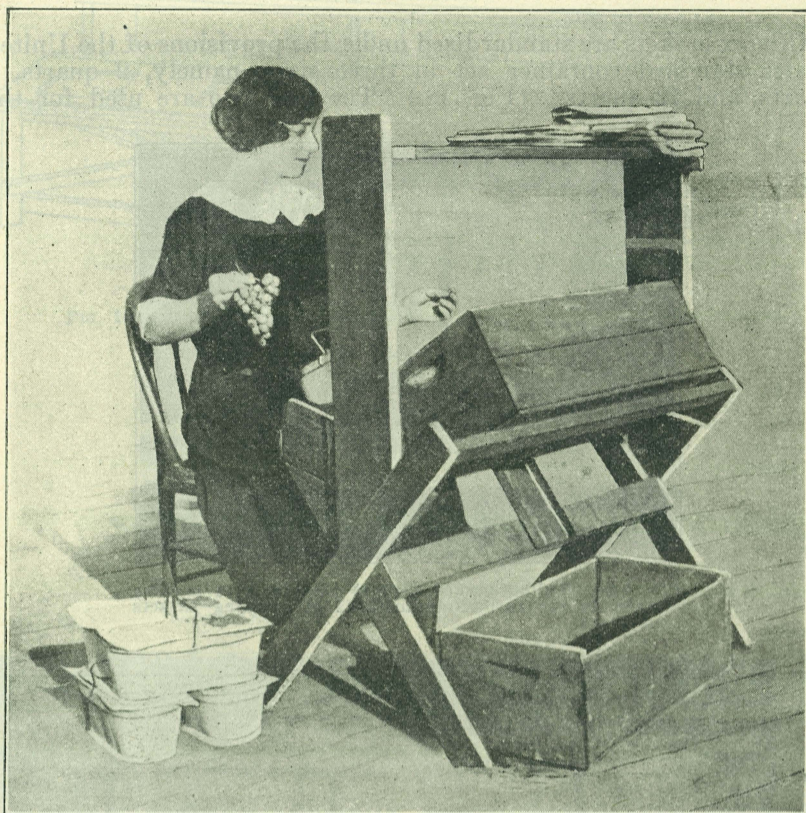


FIG. 12.—Single-unit packing table. Note box on floor for cull grapes

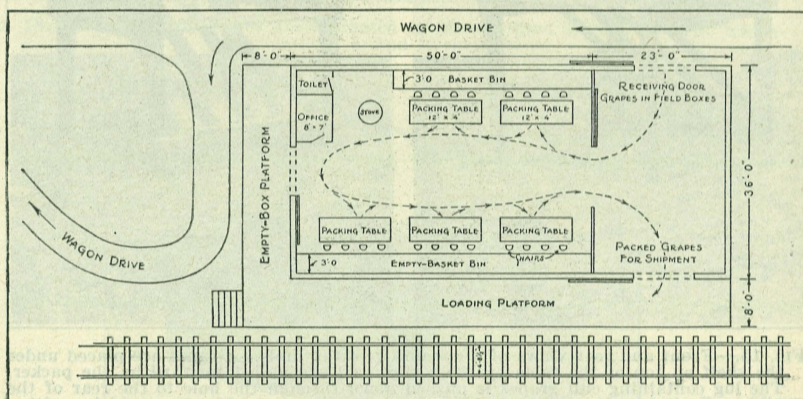


FIG. 13.—Floor plan of grape-packing house. Note arrangement of packing tables, packers' chairs, and basket bins



## PACKAGES

Climax baskets are standardized under the provisions of the United States standard container act in three sizes, namely, 2 quarts, 4 quarts, and 12 quarts. (Fig. 18.) The first two are used for the

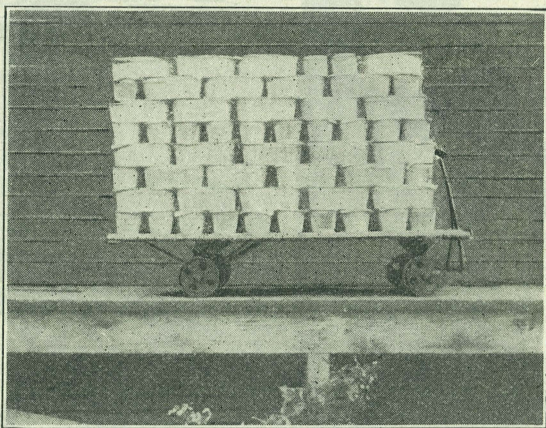


FIG. 14.—Hauling packed 2-quart baskets from packing room to the car. Note methods of stacking baskets on truck

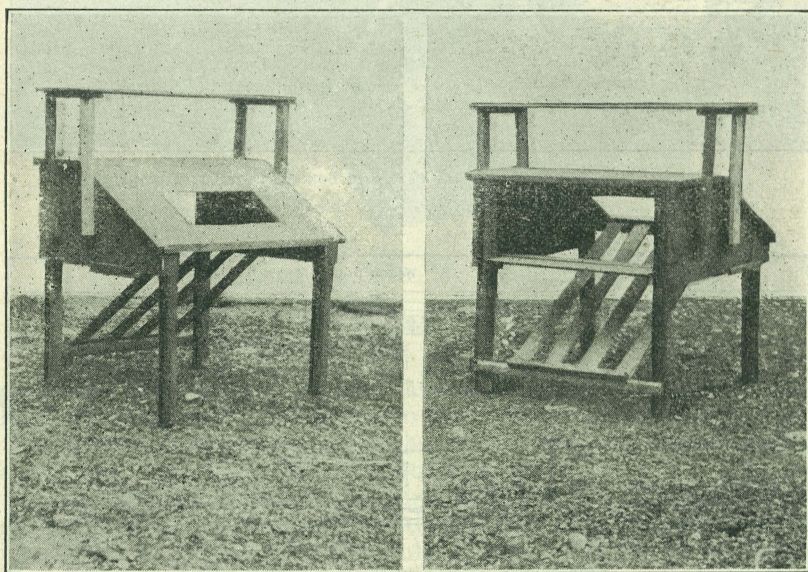


FIG. 15.—Front and rear views of a one-unit packing table. Grapes are placed under the shelf on top of the table by the tender and are pulled forward by the packer. The lug containing cull grapes is pushed down through the hole to the rear of the table. Packed baskets are placed on the shelf above the table, from which position they are removed by the tender

table-grape packs. Within the last few years several types of wire handles have been developed for these sizes which have rapidly replaced the wooden handles formerly used and which are still com-



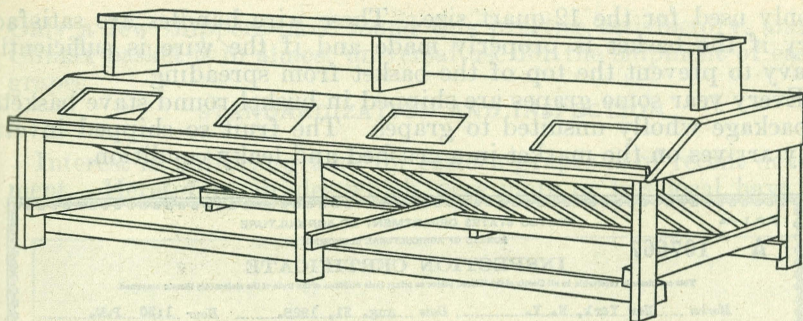


FIG. 16.—Four-unit packing table. This is the most practical size

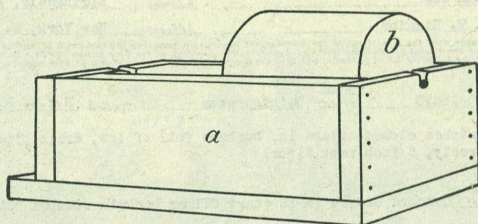


FIG. 17.—Labeling machine consisting of (a) metal-lined water-tight box and (b) cloth-covered roller

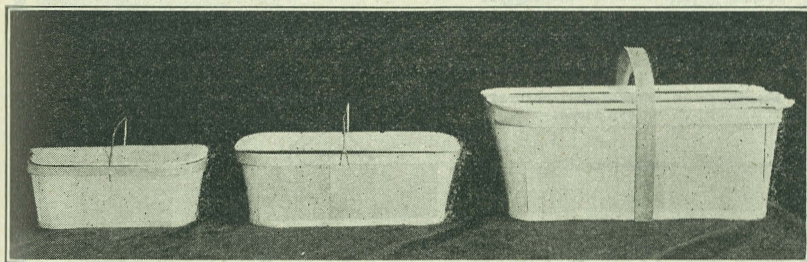


FIG. 18.—Most eastern grapes are marketed in standardized Climax baskets, which are made in 2, 4, and 12 quart sizes

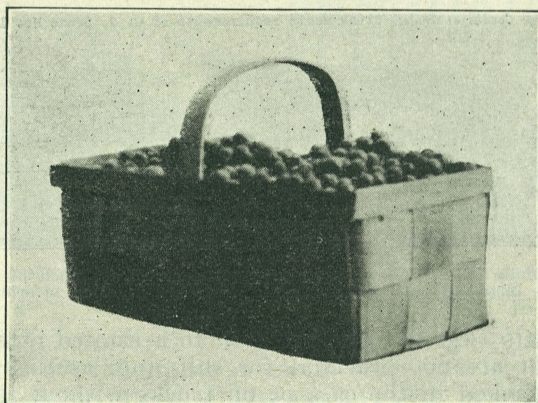


FIG. 19.—Twelve-quart square-cornered splint basket used at a few local markets. Grapes are seldom shipped in this type of container



monly used for the 12-quart size. These wire handles are satisfactory if the basket is properly made and if the wire is sufficiently heavy to prevent the top of the basket from spreading.

Every year some grapes are shipped in bushel round stave baskets, a package wholly unsuited to grapes. The fruit so shipped invariably arrives on the market in a crushed and leaky condition.


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A 107667		BUREAU OF AGRICULTURAL ECONOMICS	
<b>INSPECTION CERTIFICATE</b>			
<small>This certificate is receivable in all Courts of the United States as prima facie evidence of the truth of the statements therein contained.</small>			
Market	New York, N. Y.	Date	Aug. 31, 1925
		Hour	1:30 P.M.
To	John Doe	Address	New York, N. Y.
Shipper	John Doe	Address	Springdale, Ark.
Receiver	J. T. Higgins	Address	New York, N. Y.
<small>I certify that in compliance with the regulations of the Secretary of Agriculture governing the inspection of various products pursuant to the Act making appropriations for the United States Department of Agriculture, I inspected, at the time and on the date stated above, samples believed by me to be representative of the following lot of products, and that the quality and condition as shown by said samples, at said time and on said date, were as stated below:</small>			
Car initials and number	M.D.T. 18616	Kind of car	Refrigerator
		Where inspected	N.Y.C. R.R. Yds.
Condition of car:	Hatches closed, plugs in, bunkers full of ice, drain pipes dripping freely, 5 inch rack floor.		
Products inspected and distinguishing marks:	Concord Grapes in 12 quart Climax baskets stamped "Choice Grapes."		
Condition of load and containers:	Loose full length of car 7 layers high, 10 rows wide, no breakage noted.		
Condition of pack:	Baskets well filled.		
Temperature of product:	Between doors top 44 ° F., Bottom 43 ° F., Bunkers top 43 ° F.		
Size:	Medium sized bunches and berries.		
Maturity; Color:	Berries well matured, firm, fresh, well colored, and firmly attached to cap stems.		
Decay:	Practically none (less than 1%).		
Other blemishes and defects	Stock shows an average of 4% of crushed berries.		
Summary—Quality Condition; Grade:	Stock meets requirements of U. S. Grade No. 1.		
		Remarks:	
		Fee	John Brown,
		Expenses	Inspector.
		Total	Address 102 Warren St., New York, N. Y.
PLEASE REFER TO THIS CERTIFICATE BY NUMBER AND MARKET			

Fig. 20.—Facsimile of a farm-products inspection certificate such as is issued by United States inspectors of food products. Note the detailed information given

Splint baskets (fig. 19) also are used to a limited extent for local marketing, but are not practical for shipping, as they can not be successfully stacked in the cars or on trucks without injury to the grapes.

Late in the season juice grapes are sometimes shipped in field picking boxes. These boxes are returned after the grapes are sold.



Only a few shippers have found this practice satisfactory, and the Climax basket is in almost universal use for the shipment of eastern grapes.

#### STANDARDIZATION AND INSPECTION

Interest in uniform grades for eastern grapes is of recent development. Heretofore, grades which were more or less local have been

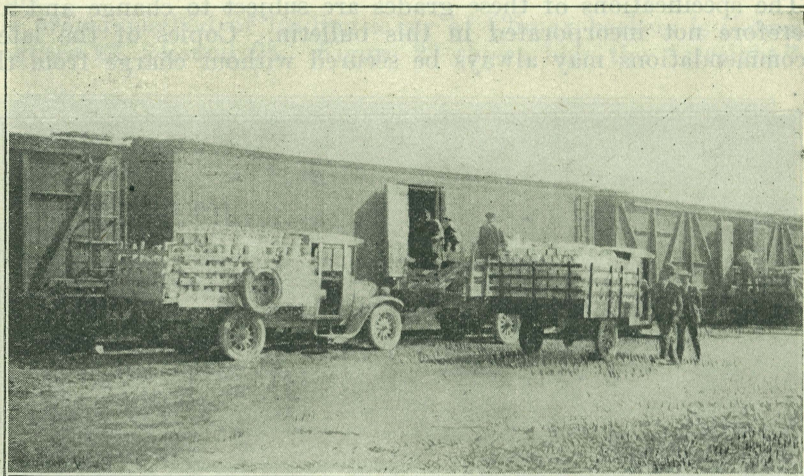


FIG. 21.—Loading grapes into cars

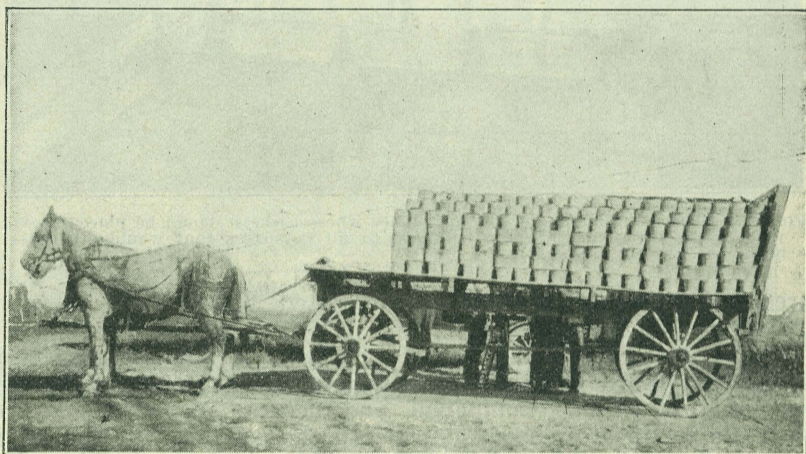


FIG. 22.—Hauling packed 4-quart baskets from vineyard to cars. Note flat rack used on wagon

in use. State standards for grades are in effect in Michigan and Washington, but the grades in use in other districts have been those of individuals, private shippers, and growers' associations. As new interest in the packing of table stock was expressed, requests from various sources were made upon the Bureau of Agricultural Eco-



nomics to determine the feasibility of a national standard for grades. After two seasons of study, standardized grades were recommended which in general terms provided for a premium grade of table stock to be known as U. S. Fancy, a first-class commercial pack of table stock to be called U. S. No. 1, and a third grade of stock, for juice or other purposes, comprised of small or straggly bunches and other grapes that are of inferior appearance but are suitable for shipment. This grade is called U. S. No. 2.

The specifications of these grades are subject to change and are therefore not incorporated in this bulletin. Copies of the latest recommendations may always be secured without charge from the



FIG. 23.—Good, snug loading. The only place where baskets should be placed crosswise of the car is next to the bulkhead to fill in spaces that would otherwise be vacant. (Note A and B)

Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

The Department of Agriculture provides an official inspection service both in the leading markets and, by arrangement, at the point of production. Competent and neutral inspection is provided, the certificates showing in detail the condition of the lot at the time of examination. A typical certificate is shown in Figure 20. This service has increased rapidly in popularity as it has proved exceedingly useful to shippers and receivers in connection with sales and adjustments, and to both of them and to the transportation companies in the settlement of railroad claims. Certificates are furnished only on application, and a fee is charged to cover the cost of the service.



## LOADING

The successful delivery of grapes to the market depends upon the care with which they are loaded on trucks and wagons and in the cars. Properly loaded trucks and wagons are shown in Figures 21 and 22. The surface upon which the bottom layer rests should be smooth, and the top layers should be stacked squarely on the bottom ones, with no unnecessary space between the stacks to allow shifting.

The proper method of loading a car of Climax baskets is shown in Figures 23, 24, and 25. Figure 23 shows how the "straight"

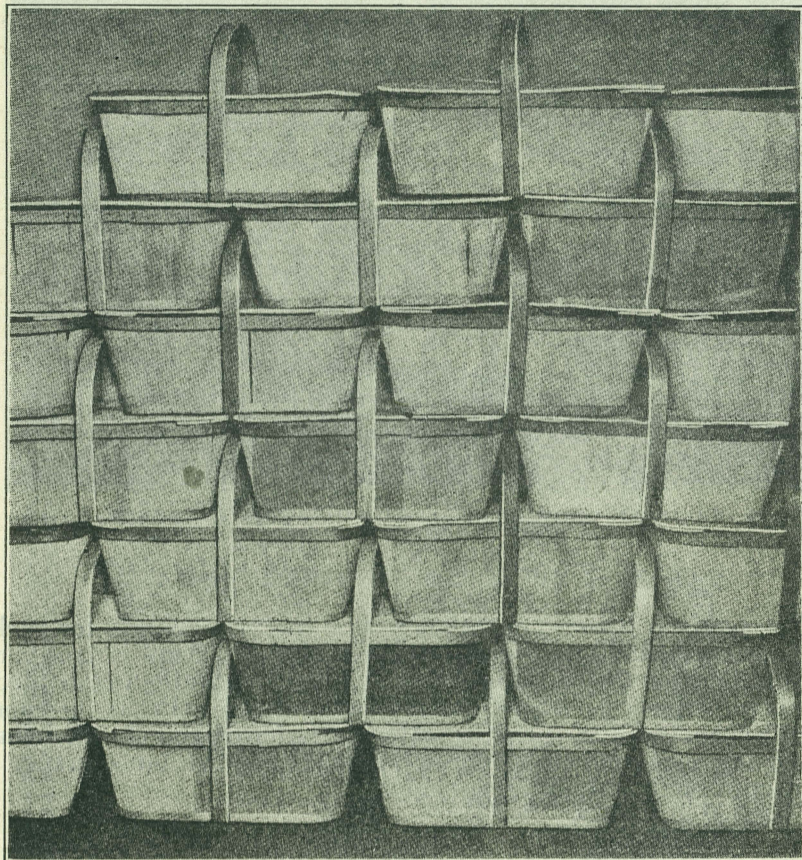


FIG. 24.—"Straight" system of loading. The baskets are well placed, and there is no surplus space between them

system is started; Figure 24 shows the completed row. Any extra space at the end of the car must be taken up by constructing a bulkhead, whereas extra space at the side of the car may be filled by placing the last row in a diagonal position, as shown started in Figure 25. This row is often referred to as "the worm." Baskets should never be loaded crosswise of the car, except as shown in Figure 23.

All uneven places on the car floor should be leveled before loading.



## GRAPES FOR JUICE FACTORIES

Grapes picked for delivery to juice factories should be well colored and high in sugar content. The most careful manufacturers remove decayed and insect-injured berries before placing the fruit in the presses.



FIG. 25.—“Diagonal” system of loading used in the last row loaded to take up extra space at the side of the car

## CORRECT METHODS SIMPLE BUT IMPORTANT

The foregoing discussion indicates that the requirements for packing eastern table grapes are relatively simple. This is true, but such as they are they must be followed with care if a high-class product is to be packed. It has already been emphasized that the enormous expansion of the juice industry in California and elsewhere has made the potential outlet for a larger supply of table grapes a subject of great interest to the industry.

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